

Abstract of the Disclosure

An optoelectronic integrated circuit comprises a substrate, a multilayer structure formed on the substrate, and an array of thyristor devices and corresponding resonant cavities formed in the multilayer structure. The resonant cavities, which are adapted to process different wavelengths of light, are formed by selectively removing portions of said multilayer structure to provide said resonant cavities with different vertical dimensions that correspond to the different wavelengths. Preferably, that portion of the multilayer structure that is selectively removed to provide the multiple wavelengths includes a periodic substructure formed by repeating pairs of an undoped spacer layer and an undoped etch stop layer. The multilayer structure may be formed from group III-V materials. In this case, the undoped spacer layer and undoped etch stop layer of the periodic substructure preferably comprises undoped GaAs and undoped AlAs, respectively. The undoped AlAs functions as an etch stop during etching by a chlorine-based gas mixture that includes fluorine. The array of multi-wavelength thyristor devices may be used to realize devices that provide a variety of optoelectronic functions, such as an array of thyristor-based lasers that emit light at different wavelengths and/or an array of thyristor-based detectors that detect light at different wavelengths (e.g., for wavelength-division-multiplexing applications).